THE ELECTRICAL WORLD

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Steam Engines for Driving Dynamo-Electric Machines.—IV.

THE HARMON, GIBBS & CO. ENGINE.

In the preceding article of this series we described a new and ingenious method of regulation invented by Mr. F. H. Ball and we analyzed its operation in the Ball automatic cut-off engine in which it has been successfully embodied. We emphasized the usefulness and the desirability of this new method by showing that it involves the true principle of correct and precise regulation, making the load itself gauge the supply of steam admitted into the cylinder. To show its adaptability under varied conditions of power and speed we present it herewith in a new form of single-valve automatic cut-off engine manufactured by Messrs. Harmon, Gibbs & Co., of Corry, Penn. (Fig. 1), the Ball governor (Fig. 2) being used with a different type of engine.

The Ball engine, it will be remembered, is made in three standard sizes only, ranging from 20 to 60 horse power. This engine is made specially for high speed, and therefore the length of stroke is short as compared with the diameter of the cylinder. The engines manufactured by Messrs. Harmon, Gibbs & Co., are intended for higher power, and are made in five standard sizes ranging from 60 to 150 horse power, or above. In this case a very high speed of rotation is not aimed at. The length of stroke is made longer as compared with the diameter of the cylinder, so that, though the piston travel may be as many feet per minute, the speed of rotation is lower. The sizes of the smallest type are 12 × 16 and of the largest 20 × 30. The normal speeds for which these engines are built, varies from 175 revolutions for the smallest size, to from 80 to 100 for the largest. The firm makes a specialty of the second size, known as "No. 7," having 12 × 20 cylinder and intended for a normal speed of 155 revolutions. Of course the speed of these engines may be varied considerably above or below the point at which they are adjusted, by regulating the tension of the governor springs, and for special purposes requiring it they may be constructed to run normally at higher speeds than those given. The driving pulley has a diameter of 72 inches in the first four sizes of engine, and of 96 inches in the largest size, though these may be replaced by even larger pulleys. These engines would therefore drive dynamo-electric machines at a sufficient speed when belted direct, though they are specially adapted to cases where several dynamo-electric machines are driven by a single engine of higher power by means of a countershaft.

The frame is of the girder type patterned after the Corliss frame. In this respect the engine is anomalous, for it is, so far as we know, the only single-valve automatic engine which has this form of frame. The pedestal at the crank end on which the main bearing rests is cast in one piece with the frame. The bearing at the outer end of the crank-shaft is also of a pedestal form and rests on a foundation level with the other pedestal, and with the pedestal supporting the cylinder. This pedestal is cast in one piece with the cylinder and steam chest. The cylinder is secured to the turned flange on the end of the girder frame by means of bolts passing through the flange and the inner head of the cylinder. The cross-head has adjustable brass gibs which slide on guides of ample wearing surface, forming part of the frame itself. The wrist-pin and crank-pin are of steel and of large size. Lubrication is provided for at all the moving parts by sight-feed oilers. The ports are made large. The valve is a plain balanced slide pattern, and it is accurately fitted in its seat by careful scraping. The valve gear, eccentric mechanism, etc., being exactly identical in construction and operation with that in the Ball engine, require no special description here. Everything that has been said regarding the Ball governor and its working in the preceding article will apply in this case. These engines are said indeed to govern with almost absolute perfection and precision, the fluctuations experienced under great variations of load being well nigh imperceptible.

These engines may be said in a measure to fill the gap between the high speed and the slow speed engine at the same time that they simulate in appearance a phase of evolution of the one to the other. It might be also that they hold the same relative place in point of comparative cost and economy. Their extreme simplicity of construction is favorable so far as first cost and the expense of repairs are concerned. On the score of economy of fuel in running the makers claim for them results equal to thos of engines having the best and most complicated cut-off gear. But even conceding a point to the Corliss engine in this respect, the Harmon, Gibbs & Co. engine is worthy of the consideration of electrical engineers for situations where a single engine is required to drive several dynamo electric machines, because its higher speed of rotation allows less slackening as the crank passes the dead centre and specially, because it is capable of quick, close regulation.

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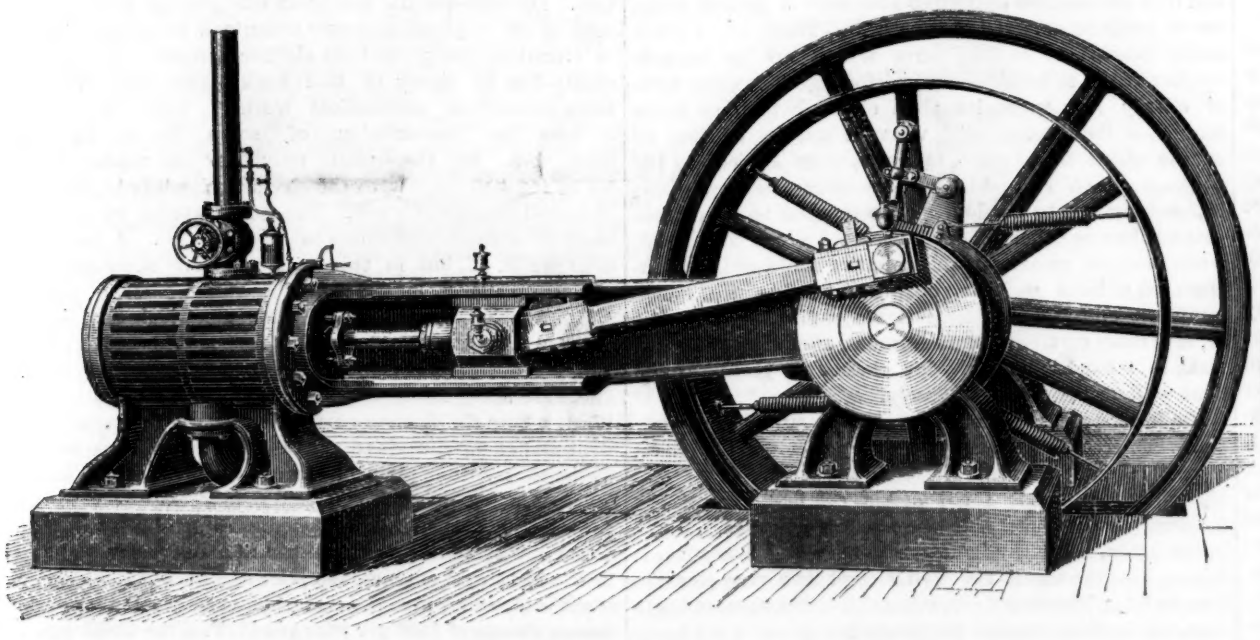
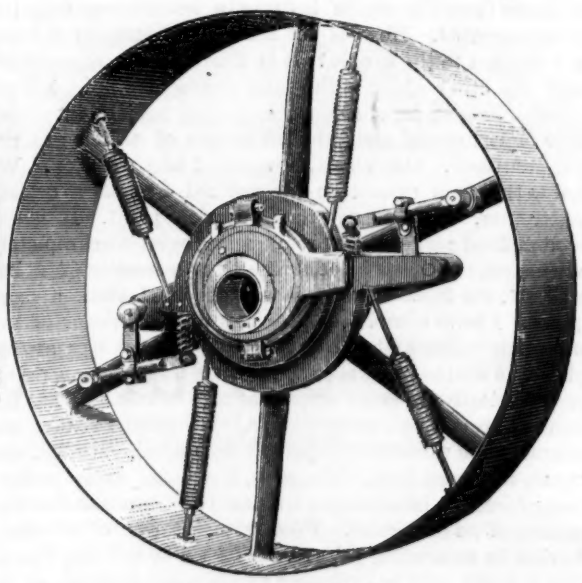


THE HARMON, GIBBS & CO. ENGINE.



THE GOVERNOR.

The Telegraph as a Means of Public Protection.

The late extraordinary outburst of public feeling at Cincinnati against the law's delay and the ease with which murderers have escaped from justice, has shown incidentally the value of the telegraph. When the indignation of the people manifested itself in deeds last week and became as lawless as the crimes against which it was at first a worthy protest, the necessity arose of summoning troops from all parts of the State to the aid of the local authorities, and the wires were freely resorted to. At Columbus, Governor Hoadly made the office of General Manager McCrea, of the Pittsburgh, Cincinnati & St. Louis Railway, his headquarters, and a wire was kept free for him by which to communicate with the moving troops and with those in command of the forces already concentrated at Cincinnati. The mob evinced a clear perception of the value of the telegraph as a means of public protection by threatening to destroy the Western Union office and by cutting many of the wires.

Expediting Legislation by Electricity.

Much time is now lost in the proceedings of legislative bodies in taking the votes, and in England Mr. Parnell and his followers have notably availed themselves of this means of delay to block obnoxious legislation. By means of electricity, however, a roll call can now be taken very quickly, and it is proposed to introduce an electric system here. We have already published some particulars about it, and now take the subjoined from the Washington *Post:*

In the room of the House Committee on Education is exhibited the electric device for enabling a yea and nay vote to be taken in the House instantaneously, instead of consuming nearly an hour, as at present. Each member would have on his desk a small lever, which when turned to the right, votes "yes" and the left "no." The "yeas" and "nays" are taken at the same time. The votes are automatically counted and the result placed before the presiding officer. The name of each member voting and his State, and also the word "yea" and "nay" is at the same time printed on a record sheet on the Clerk's desk and exhibited on an annunciator in full view of every one. At the close of each day's proceedings the record sheet, showing in consecutive order every vote taken, is removed for the use of the printer.

There is no possibility of any member voting twice on the same call or motion, as in the act of voting he breaks his circuit, which is not again closed until the vote is announced. In making a call of the roll the record sheet will contain the names of the members present, and the number present will be shown on the presiding officer's desk. In addition to the voting apparatus each member would have upon his desk an electric press-knob, operating on an annunciator, for summoning pages.

The Inventors' Convention.

Some practical business appears to have been done at the Inventors' Convention, held at Cincinnati, O., last week. The resolutions declare that as much of the progress of the country is the result of inventive genius, any material change in the patent laws would be inadvisable. Congress is therefore asked to oppose the passage of any bill which would have the effect of discouraging the inventor by impairing the value of patented property, or would impose unequal burdens on the owners of such property in maintaining their rights. They also declare that it is the duty of Congress to provide sufficient clerical force to do the work of the patent office well and keep it up to date; also to provide a suitable library of scientific works for the use of the patent office and inventors; also that the patent office should be made a department with a cabinet officer in charge; also that there should be a legal bureau or division in the patent office. They point out, too, that although there have been nearly 300,000 patents granted, there have been scarcely a score which the public has objected to, and no patent based on wrong which the courts have not finally held invalid. The organization will be permanent.

The Theory of Magnetism.*

BY PROF. D. E. HUGHES, F.R.S.

(CONTINUED.)

Experimental Evidences.

In the above theory the coercive force of Poisson is replaced by molecular rigidity and freedom; and as the effects of mechanical vibrations, torsion, and stress upon the apparent destruction and facilitation of magnetism is well known, I will, before demonstrating the more serious parts of the theory, make a few experiments to prove that molecular rigidity fulfills all the requirements of an assumed coercive force.

I will now show you that if I magnetize a soft iron rod, the slightest mechanical vibration reduces it to zero, while in tempered steel or hard iron the molecules are comparatively rigid, and are but slightly affected. The numerous experimental evidences which I shall show prove that, while the molecules are not completely rigid in steel, they are comparatively rigid when compared with the extraordinary molecular freedom shown in soft iron. (Experiments shown.)

If I now take a bottle of iron filings I am enabled to show how completely rigid they appear if not shaken, but the slightest motion allows these filings to rotate and short circuit themselves, thus producing apparent neutrality. Now I will restore the lost magnetism by letting the filings slowly fall on each other under the influence of the earth's magnetic force; and here we have an evident proof of rotation producing the result, as we can ourselves perceive the arrangement of the filings. (Experiment shown.)

If I take this extremely soft bar of iron you notice that the slightest mechanical tremor allows molecular rotation and consequent loss or change of polarity, but if I put a slight strain on this bar so as to fasten each molecule they cannot turn with the same freedom as before, and they now retain their symmetrical polarity like tempered steel even when violently hammered. (Experiment shown.)

We can only arrive at one conclusion from this experiment, viz., that the retention of apparent magnetism is imply due to a frictional resistance to rotation and whenever this frictional resistance is reduced, as when we take off a mechanical strain or by making the bar red hot, the molecules then rotate with an almost inconceivable freedom from frictional resistance

Conduction.

You notice, if I place this small magnet at several inches distance from the needle it turns in accordance with the pole presented. How is the influence transmitted from the magnet to the needle? It is through the atmosphere and the ether which is the intervening medium. I have made a long series of researches on this subject, involving new experimental methods, the results of which are not yet published. One result, however, I may mention. We know that iron cannot be magnetized beyond a certain maximum, which we call its saturation point. It has a well-defined curve of rise to saturation, agreeing completely with a curve of force produced by the rotation of a bar magnet, the force of which was observed from a fixed point. I have completely demonstrated, by means of my magnetic balance (shown in the library), that our atmosphere, as well as Crookes's vacuum, has its saturating point, exactly similar in every respect to that of iron. It has the same form through every degree. We cannot reduce nor augment the saturating point of ether; it is invariable, and equals the finest iron. We may, however, easily reduce that of iron by introducing frictional resistance to the free motion of its molecules. From consideration of the ether having its saturating point, I am forced to the conclusion that it could only be explained by a similar rotation of its atoms as demonstrable in iron.

Reflection would teach us that there cannot be two laws of magnetism, such as one of vibrations in the ether, and rotations in iron. We cannot have two correct theories of heat, light, or magnetism, the mode of motion in the case of magnetism being rotation, and not vibration.

Let us observe this saturation point of ether compared with iron. I pass a strong current of electricity in this coil. The coil is quite hot, so we are very near its saturation. I now place this coil at a certain distance from the needle (8. in.). We have now a deflection of 45° on the needle. I now introduce this iron core exactly fitting the interior, previously filled by the ether and atmosphere, its force is much greater. So I gradually remove this coil to a distance, where I find the same deflection as before (45°). This happens to be at twice the distance, or 16 in., so we know, according to the law of inverse squares, that the iron has four times the magnetic power of the ether; but this is only true for this piece of iron. With extremely fine specimens of iron I have been enabled to increase the force of the coil forty times, while with manganese steel containing 10 per cent. of manganese it was only 30 per cent, superior. We see here that the atmosphere is extremely magnetic. Let us replace the solid bar by iron filings. We now only have twice the force of ether. Replace this by a bottle of sulphite of iron in a liquid state. It is now a mere fraction superior to the atmosphere, and if we were still further to separate the iron molecules, as in a gaseous state, it is reasonable to suppose that if we could isolate the iron gas from that of ether, that iron gas would be strongly diamagnetic, or have far less magnetic capacity than ether, owing to the great separation of its molecules. These are assumptions, but they are based upon experimental evidence which give them value.

Let us quit the domain of assumption to enter that of demonstration. Here I have a long bar of neutral iron. If I place this small magnet at one end we notice that its pole has moved forward 3 in., having a consequent point at that place. Let us now vibrate this rod, and you notice the slow but gradual creeping of the conduction until at the end of two seconds it has reached 14 in. The molecules have been freed from frictional resistance by the mechanical vibrations, and the molecules have at once rotated all along the bar. (Experiment shown.)

Let us repeat this experiment by heating the rod to red heat. You notice the gradual creeping or increased conduction as the heat allows greater molecular freedom. (Experiment shown.)

Let us now again repeat this experiment by sending a current of electricity through the bar. You notice the instant that I touch the bar with this wire conveying the current through it, that we have identically the same creeping forward, no matter what direction of the current. (Experiment shown.)

If you simply looked at the effects produced you could not tell which method I had employed, either mechanical vibrations, heat vibrations, or electrical currents. Consequently, knowing the two first to be modes of motion, it is fair to assume that an electrical current is a mode of motion, the manner of which is at present unknown; but that there is a molecular disturbance in each case is evident from the experiments shown.

[TO BE CONTINUED.]

* Paper read before the Royal Institution, 29th February, 1884.

Electrical Appliances on the Farm.

BY JAMES CHEESMAN, MONTREAL.

One of the problems of the near future which the farmer is called upon to consider is a better organization of agricultural work. As the years roll on the labor question shows no sign of becoming less burning, nor do the rates of wages promise any permanent reduction. How can the labor already employed be made more efficient? How can more work be accomplished without adding to the permanent expenses of the farm? If the number of horses be increased so must the number of hands also, and if steam engines be used so also must a greater number of hands be engaged to run them. There are a great many operations on the farm which are so entirely mechanical as to be capable of performance by some form of energy less expensive than either human or horse muscle, or than steam itself when it implies hauling an engine about from place to place, ever subject to the contingencies of risk peculiar to the circumstances. Thus if threshing has to be done, or wood must be cut, grain ground, hay or other fodder cut, roots sliced or pulped, water pumped, cream separated, butter made, or the windlass used to hoist weights, one or several pairs of hands must be used to manipulate a steam engine, horse-power, or, still more costly, the farmer must allot some of these tasks to "hands" and take his chance of getting them done well or ill, quickly or slowly.

If a horse-power be used it involves an outlay of capital, and when erected will occupy some space which the operator will often find useful for other purposes. If no provision has been made for it in the original plan of the building it will sometimes amount to a nuisance. When in operation, if high and very uniform speed is needed, it fails to give the result required except in a very unsatisfactory way. The cost of operating will be the value of horse hire, or, in the farmers' language, the price of his keep, plus interest and other expenses. Again, it is of a character which renders it liable to risks of breakage which entails frequent repairs. Steam engines also have characteristics which require the supervision of the farmer, and the expenditure of coal which must be carted from a distance of several miles unless wood can be had on the farm. There are few agricultural engines which can show a consumption of less than five to seven or more pounds of fuel per horse-power per hour. When wanted for use, the engine must be hauled round to any part of the farm unless it be a stationary engine. Not the least objection is the risk of fire, and the great danger of burning up one's buildings, animals and stored crops. These considerations have a most powerful influence on the minds of men who need the aid which horse-powers and steam engines are designed to supply.

A form of energy exists, however, suitable for farm use which has hitherto remained beyond reach, but which may at any turn of fortune's wheel come upon us as a handmaid of farm work, and come to stay. It is cheaper than any other that can be used on the farm in all cases where the power is needed for temporary or occasional use only, and where less than 15 or 20 horse-power is wanted. Even then it may well be doubted whether the use of electrical energy is not the more economical when coal has to be brought from a distance. The main question involved in connection with the use of this power is one of organization among farmers within a well defined and close area. To supply electric current for motive power on a farm economically it would be necessary for twelve or twenty farmers cultivating 2,000 to 3,000 acres of land to co-operate with a company for the supply of power from a central station where water was available, or where coal could be obtained without hauling it more than a few yards, or at most a hundred yards. A station might be so placed as to be alongside a coal train car siding, and thus unload its own coal. Taking the consumption of power in a district of 2,560 acres, or four square miles representing twelve or fifteen farms, at one horse-power per forty acres, we have a demand of sixty-four horse-power of electrical energy. For the purpose of testing this application fairly we will suppose the power station located within the centre of the area, so that the electrical conductor need not extend more than one mile from the point of generation, thus minimizing resistance. For this purpose it would be necessary to lay down a one hundred horse-power steam engine, or, better still, a pair of fifties. Fuel consumption on large stationary engines is now down to the low point of two pounds per hour per horse-power. This would be equivalent to 200 pounds per hour if in full operation. Besides this four to eight dynamo-electric machines would be required to generate currents of electricity to actuate the motors stationed on the farms. From the station No. 4 or 5 wire conductors (about three-sixteenths of an inch) would distribute the current to the motors or electrical engines. Farm steam engines have attained a very high state of efficiency, but few of them have a less weight than 1,000 pounds per horse-power; some have much more. Electric engines have a weight of from 150 to 200 pounds per horse-power, and are snug, compact, and small enough to stand in a space of about two to three feet square. These machines will give out from one to five horse-power each, so that where but little energy is needed not more than is required need be called into operation. Thus, if a separate source of power is needed to grind, cut and otherwise prepare food in one place, and a second is wanted for dairy use in another, or one for pumping in a third, or to operate a cold-air machine, separate and independent motors can be used, or all these operations may be concentrated at one place under one roof. One small engine of five horse-power might at different times perform the various operations of grinding, cutting, pulping food, creaming and churning for the dairy, cutting wood, pumping water or elevating, doing the family washing, operate a sausage machine or a sewing machine, and all this at a cost of a few cents per hour, while at night every farm could be furnished with light from the same central station. Dynamo-electric machines will give out fully 90 per cent. of the mechanical power consumed to operate them, as electrical energy, and an electric circuit will convert eighty-five to ninety of this back again into electric horse-power as mechanical work. Thus we have a loss in transmission of some 20 to 25 per cent., but in the plan provision is made here for 36 per cent. of loss, as the circuit is a short one, and the electrical resistance is low. The consumption of fuel in small farm engines amounts to at least 5 lbs. of fuel per hour per H. P., but in this case we have sixty-four to seventy-five H. P. for 200 lbs. of coal per hour, or about 2.75 to 3 lbs. per hour. Whenever an electrical plant is laid down in this way it may be taken for granted that lighting will be its principal business, and power an auxiliary only. There are many small towns and villages, especially out West, where the electric current is the only source of efficient and cheap illumination available. It would be worth while to try the plan of furnishing power to small consumers in some such way, and demonstrate once for all how cheaply it could be supplied. To estimate the cost of the new system it may be taken at about $50 to $60 per H. P. as in steam engines, the price of, or rent of conductor in place of boiler, plus the cost of power. To steam power users a charge of $200 per year per H. P. is the usual practice, but it may be doubted whether the charge for the service need be greater than about double the value of the coal consumed in the case of large stations, or say seven pounds of coal per electrical H. P. would result thus: 64 H.P. + 7 = 448 per hour. Ten hours per day and 312 working days per year would foot up a fraction less than seven hundred tons of coal, which at $6 to $7 per ton at the farm would mean $4,700 to $4,900. The value of a plant for such a station would cost about $20,000. If charged at half the price of steam power the revenue in this case would be $6,400 per annum. The rent and taxes of the building might be taken at $400, 10 per cent. on value, $4,000; labor, $1,800; interest on plant, 8 per cent., $1,600; oil, waste and sundries, $200; and 3 per cent. for repairs, $600; coal, one ton per day of ten hours for 100 H. P. engine at $4 per ton, $1,248, or a total of $5,848. This would leave a balance of $552 to pay for contingencies. The price of $100 a year would be equivalent to but a fraction over a twelve pounds per hour consumption of fuel per H. P.

It has, of course, been assumed all through this argument that the farm work would be so organized as to be able to use such power regularly through the day or for at least eighty per cent. of the time. The calculation has been figured closely, as only sixty-four H. P. has been considered available, whereas seventy-five would be nearer the fact. Then, again, it has been taken for granted that a one hundred horse-power steam engine would be worked up to its limit. Considering every farmer would not use his full amount except on rare occasions, nor for the full amount of time charged, it would not be at all sanguine to reduce this H. P. to sixty or widen the area of the district served. These facts indicate a full provision for contingencies.

Nothing has yet been urged on the side of lighting. Either

the village or town or the farmhouse might be lighted from the same station. Such a station could give at least 1,000 candle-power per horse-power employed in arc lights, or eight 16 candle-power incandescent lamps for domestic and farm use.

Respecting electrical energy as a substitute for horses or steam in plowing, reaping and harvesting, silence has been kept. They will come, but not till the simpler and more urgent wants of the farm have been met. Electric engines would involve a great economy of labor for the purposes indicated, as well as in the latter sphere. One or two men may be dispensed with by proper organization where stationary engines are employed, and where portable ones are required in the field to plow, reap and harvest. The facility with which they may be moved about with one horse, and the simplicity of accompanying appendages are arguments in their favor which will not be passed over lightly

A Gas Bill the Cause of Mourning.

A good story is current in Washington just now about the Chinese minister, and as a great many of our readers are actively employed in the work of abolishing that fruitful source of domestic grief, the gas-bill, we venture to tell it: Mr. Tsao Ju, the minister, is a most deliciously absurd old person and looks like a codfish. He knows about seven words of English. One day not long since Mr. Ju, stepping out of his front door, saw a printed yellow slip which had been left by the gas man lying in the vestibule. Now, yellow paper in China signifies the death of a very distinguished person, so Mr. Tsao, in much agitation, sent for the interpreter. The interpreter had gone off to the Theatre Comique, and so the legation was left to wrestle with the gas bill alone. The whole suite was summoned, and it was concluded that the President was defunct, and this was the official notice. Mr. Tsao immediately retired to the drawing room with his suite, had every window shut up, and placing the gas bill upon the effigy of Confucius, he and his suite proceeded to hold a Chinese wake. They howled in chorus, and they howled separately. The minister howled for an hour in the blue petticoat he usually wears, and then changed it to a yellow petticoat and howled more vociferously than ever, while he beat his breast and tore at his queue. An African lady employed about the kitchen peeped through the door after hearing the hullabaloo, but seeing the gas bill and knowing the methods of the Washington Gas Company, retired, thinking it nothing remarkable that people should howl over the gas bills of the Washington Gas Company. A policeman, accompanied by a number of aroused citizens, pounded at the back gate and demanded to know who was being murdered by Mr. Tsao Ju. The African lady explained that, "Tisn't nuffin but the gas bill, an' dat's 'nuff to make folks holler." The policeman, seeing the reasonableness of this, departed. After five hours of bawling, interspersed with tea, firecrackers and Chinese hymns, the interpreter returned, and it was found instead of the President being dead the gas company merely demanded about $25 for burning $7 worth of gas.

The Thomson-Houston System's Merits.

We take the following, with reference to the merits of the Thomson-Houston system, from the Boston *Traveler* of March 26:

Interesting evidence of the wonderful simplicity of this system has just been furnished from the west coast of Mexico. Last autumn one of the Thomson-Houston machines was shipped to tha point, unaccompanied by any expert, and was intrusted to hands entirely unfamiliar with electric lighting. The result is, that, even under these conditions, the machine has been running continuously, with the most satisfactory results. Parties who have traveled all over the world and seen all systems of electric lighting, pronounce it to be superior to any they have witnessed, and orders have already been sent forward for more apparatus. We understand the company has recently made remarkable improvements in its apparatus at its factory in Lynn, under the direction of Prof. Thomson, and that *sixty-three* powerful 2,000-candle power lights are now run from one machine, in which but one commutator is used. This is certainly a triumph in electric lighting, and no other company in the world has succeeded in producing such a result. The company bids fair to surpass in the future its remarkable achievements in the past. The problem of conducting local company lighting, so as to make it a highly remunerative investment, it has already solved.

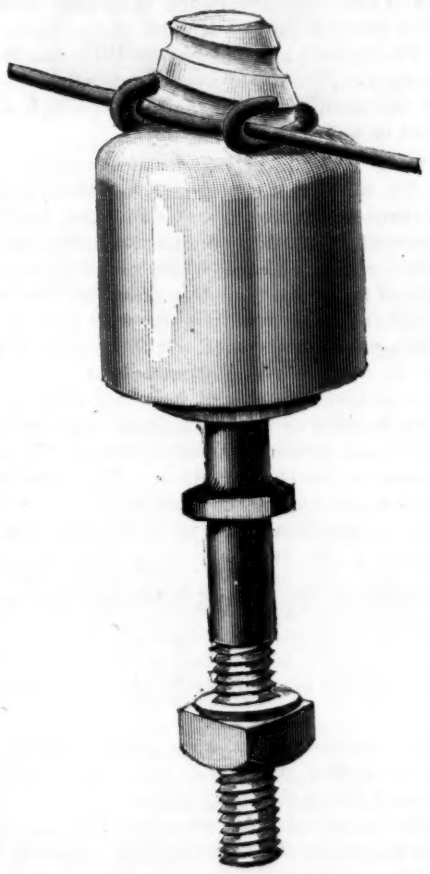
The courteous officers of the company, 131 Devonshire street, Rialto Building, take pleasure in furnishing to any one interested in the subject of electric lighting any information that may be desired concerning their interesting system, or of the operation of local companies that are using it.

ANOTHER BOSTON DISTRICT TELEGRAPH COMPANY.—The Boston District Telegraph Company has been incorporated in this city by Chauncey Belknap, of Roselle, N. J; Harvey L. Lufkin, of this city, and T. Kensett Wheeler, of Elizabeth, N. J. It is to maintain telegraph communication between places within the corporate limits of Boston and also between that city and Hartford and Stamford, Conn., and this city. Its capital stock is $150,000, divided into 15,000 shares, but it may be increased to $250,000.

Porcelain Insulators.

BY J. F. KELLY.

I noticed in a recent issue of your admirable publication a few of the results of M. Foussereau's experiments on insulators; and, on reading his figure for porcelain, was reminded of a question which often before occurred to me, *i. e.*: why are not insulators of this material more generally used in this country? Throughout Europe they are almost exclusively employed, and are found, it is said, to be superior to those of glass. One of those now used in England, known as the Lewis Self-Binding Insulator, would seem to merit more than passing attention. Its construction will be best understood by reference to the accompanying cut in which the insulator is shown with the line wire attached. The upper portion of the outside cup, it will be seen, is of smaller diameter than its main body, and is provided with a conical or expanding screw, the diameter of which increases from the top toward the bottom of the insulator. Instead of the ordinary tie-wire a rigid horse-shoe-shaped metallic clip is used, the inner surface of which is adapted to fit the screw-thread upon the insulator and whose ends are turned over so as to form open hooks adapted to grasp the line-wire. In attaching a line-wire to this insulator, the clip is first fastened to the wire by means of the open hooks at its ends. The conical top is then inserted into the stirrup thus formed and the insulator turned about its cylindrical axis. By reason of the constantly increasing diameter of the screw, the insulator soon comes to a firm bearing, after which it may be placed in its permanent position by mounting it upon a bolt-pin, or bracket, which enters into a suitable socket in the insulator. Among the advantages claimed by the inventor for his mode of attachment are the following: No special tools are necessary either to attach or detach the line. Time is saved because of simplicity and convenience. Any gauge of wire is securely held, whether the line is tightly or loosely stretched. It is impossible for the line-wire to be detached by accident. Every part of the insulator is exposed to the cleansing action of rain, and the clip being galvanized the surface is kept free from rust. The insulator touches the line-wire and clip at three points only, and hence a very small surface is exposed to leakage.



THE LEWIS SELF-BINDING INSULATOR.

As now made, these insulators consist of a double inverted cup. The addition of the inner cup, of course, adds materially to the insulating qualities.

I think these might be advantageously introduced into this country, if not for general use, at least for particular cases where high insulation is a necessity.

An American Institute of Electrical Engineers.

We give below the "call" that has been issued for the purpose of establishing a national electrical society to which it is suggested to give the name of the "American Institute of Electrical Engineers." We print also the names of the electricians and capitalists and others prominently connected with electrical enterprises, who have already given their hearty adhesion to the project:

The rapidly growing art of producing and utilizing electricity has no assistance from any American national scientific society. There is no legitimate excuse for this implied absence of scientific interest, except it be the short-sighted plea that every one is too busy to give time to scientific, practical and social intercourse, which, in other professions, have been found so conducive to advancement.

The American Societies of Civil, Mechanical and Mining Engineers which have been so prosperous and of such great advantages to their members, are good examples.

An International Electrical Exhibition is to be held in Philadelphia next autumn, to which many of the famous foreign electrical savants, engineers and manufacturers will be visitors; and it would be a lasting disgrace to American electricians if no American national electrical society was in existence to receive them with the honors due from their co-laborers of the United States.

It is proposed to organize THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS somewhat after the model of the American Civil, Mechanical and Mining Engineers' Societies or Institutes. These societies hold yearly three or four meetings, lasting three or four days each time, at various suitable places throughout the country, at which meetings the members assemble, read and discuss papers and matters relating to their trades and professions, and at the same time enjoy pleasant, personal, social intercourse, all of which is conducive to improvement and advancement in ideas, theories, practice, business and good-fellowship. The success of these societies, as well as of the various foreign electrical societies, makes it seem probable that those persons who are interested in our electrical, scientific, educational, manufacturing, telegraphic, telephonic and like concerns, as well as the users of electrical appliances generally, will find it to their advantage, personally and collectively, to establish, support, work for, and generally aid our proposed society.

It is proposed to make electrical engineers, electricians, instructors in electricity in schools and colleges, inventors and manufacturers of electrical apparatus, officers of telegraph, telephone, electric light, burglar-alarm, district messenger, electric-time, and of all companies based upon electrical inventions, as well as all who are inclined to support the organization for the common interest, eligible to membership.

It is proposed to make the yearly dues about ten dollars, and to print in book form the papers, discussions and transactions at the meetings for distribution among the members without further expense. As with other societies, these will be worth more than the annual dues. Affiliations with sister societies, a museum, library, original research, protection from unfavorable legislation, settlements of disputed electrical questions, exchanges of volumes of transactions with foreign and other electrical and scientific societies, a journal of abstracts of papers read before other societies, or published in other journals, etc., etc., are all proposed.

The subscribers hereto hereby extend an invitation to all those persons who are eligible to membership to meet them in New York City at a place to be announced hereafter, on Tuesday, the 12th day of May, 1884, for the purpose of organizing the proposed national electrical society upon substantially the basis herein set forth.

George D. Allen, Secy. Excelsior Elec. Co.
H. L. Bailey, Elecn., The Time Telegraph Co.
Wm. C. Behrens, Secretary Com. Underground Wires.
Robt. Brown, Supt. Met. Tel. & Tel. Co.
R. D. Buchanan, General Man. Overland Tel. Co.
Chas. L. Buckingham, Counsel Western Union Tel. Co.
J. H. Bunnell, Electrical Manufacturer.
Edward A. Calahan, Secy. Standard Multiplex Tel. Co.
A. B. Chandler, Prest. Fuller Electrical Co.
William A. Childs, Pres. Law Telephone Co.
C. E. Chinnock, Edison Electric Ill. Co.
L. E. Curtis, Secy. United States Elec. Lighting Co.
T. H. Delano, Pubs. *Electrical Review.*
P. B. Delany, Synchronous Multiplex Telegraph.
E. N. Dickerson, Jr., Electrician and Counsel in Patent Causes.
A. W. Dimock, Prest. Bankers & Merchants' Tel. Co.
S. B. Eaton, Prest. Edison Electric Light Co.
W. H. Eckert, Genl. Supt. Met. Tel. & Tel. Co.
Thomas A. Edison, Inventor.
Stephen D. Field, Electrician Commercial Tel. Co.
Bradley A. Fiske, Lieut. U. S. Navy, Washington.
G. V. B. Frost, Supt. Amer. District Tel. Co.
H. Seymour Geary, Vice-Prest. Fuller Elec. Co.
Augt. C. Graham, Manager *Electrician and Elec. Engineer.*
Norvin Green, Prest. Western Union Tel. Co.
George A. Hamilton, Electrician Western Union Tel. Co.
Charles D. Haskins, Electrical Engineer, Western Elec. Co.
A. A. Hayes, Prest. Brush-Swan Electric Co., Washington.
Rowland R. Hazard, President of the Gramme Elec. Co.
William Hochhausen, Prest. Excelsior Elec. Co.
E. Holmes, President Holmes Elec. Protec. Co.
George M. Hopkins, Electrician.
W. J. Johnston, Publisher of *The Electrical World.*
F. W. Jones, Electrician Bankers & Merchants' Tel. Co.
N. S. Keith, Electrical Engineer.
E. A. Leslie, Supt. Baltimore & Ohio Tel. Co.
Theo. Mace, Agt., Electrical Supply Co.
C. O. Mailloux, Electrical Engineer.
James W. McDonough, Electrician U. S. Telephone Co.
W. H. McGrath, Supt. Brush Elec. Ill. Co.
George B. Prescott, Electrician.
Frank L. Pope, Solicitor of Patents.
H. C. Roome, Gen. Mgr. Holmes Elec. Protec. Co.
S. D. Schuyler, Prest. Schuyler Electric Lt. Co.
George B. Scott, Supt. Gold & Stock Tel. Co.
J. A. Seely, Electrician Metropolitan T. & T. Co.
Frank Shaw, Engineer Law Tel. Co.
Charles S. H. Small, Asst. Supt. Gold & Stock Tel. Co.
Gerritt Smith, Circuit Electrician W. U. Tel. Co.
Geo. W. Stockly, V. P. and Mgr. Brush Elec. Co., Cleveland.
Thos. R. Taltavall, Associated Press.
L. G. Tillotson, Manufacturer.
P. H. Vander Weyde, President N. Y. Electrical Society.
Chas. J. Van Depoele, Elecn. Van Depoele E. L. Co., Chicago.
D. Van Nostrand, Publisher of Scientific Books.
Edward Weston, Electrician, United States Elec. Lighting Co.

Further information can be had from N. S. Keith, 287 Broadway, N. Y.

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Mr. Mailloux, the expert of THE ELECTRICAL WORLD, writes for it exclusively. His articles are designated thus: *,*.

Articles in the preparation of which he has assisted, and the views and statements in which he therefore indorses, are marked, **.

Correspondence on all electrical subjects is solicited. Readers are cordially invited to communicate their views and opinions on all topics within the province of this journal. Items of information relating to any application of electrical science will be thankfully received. Our friends will render us a valuable service by forwarding news *promptly* as it occurs, and by mailing us marked copies of their local papers containing anything likely to interest our readers. Anonymous communications not noticed. Rejected manuscript cannot be returned unless accompanied by the necessary postage when received.

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NEW YORK, APRIL 5, 1884

UNTIL THE END OF THE YEAR.

Those wishing to subscribe for THE ELECTRICAL WORLD from the present time until the issue of December 27, 1884, can have the paper sent to them during that period, postage prepaid, for $1.50. We can supply a few complete sets of back numbers from the beginning of the year to such as prefer having the file for 1884 complete. A remittance of $2 will cover the expense of the back issues and also of the remaining copies of the year. Present subscribers will oblige by calling the attention of non-subscribers to this matter, and endeavoring to secure a few subscriptions for us, either for the year at $2, or from April 5th until December 27th, 1884, at $1.50.

HONEST EDITORIAL OPINION.

One of our financial contemporaries took exception lately to the conservative way in which we expressed certain opinions about the stock of the Drawbaugh Telephone and Telegraph Company and the support accorded to it by the public. The journal in question does not itself deal with the Bell telephone interests in soft and euphemistic phrases, but abuses them roundly; nevertheless it thinks that papers not on its side are partial. We must thank our contemporary, however, for the admission it makes that though "the shadow of the Juggernaut Bell monopoly has paralyzed its (our) utterances," we "would clearly like to be independent and give an honest opinion." We have also received recently one or two letters from Drawbaugh partisans, who, with unconscious irony on themselves, say that because we do not officiously rush forward and champion the Drawbaugh claims we are held back by base and venal considerations, and are, as it has been elegantly put, one of "the timid and trembling organs of the Bell monopoly."

We should not take any notice of these criticisms were it not that they illustrate in a remarkable manner the tendency of some people to believe that others holding opinions contrary to their own are for that very reason vile, perjured or foolish. A little thought would make it clear to our correspondents, who prefer in some instances to remain anonymous, that if the Drawbaugh claims have been established beyond all doubt, as they assert, and are shortly to be utilized to the utter discomfiture of the Bell Company, we have at least the courage of our convictions in standing by the ship as she sinks. A little further thought would convince them that telephonic competition could not do us any harm, but would, in all likelihood, do us a great deal of good, so that we have every inducement to encourage attacks on a monopoly.

We know the high value in public estimation of honest, frank and fearless criticism, and we make bold to say that no one can lay his finger on any opinion expressed in these columns that has been other than warrantable upon a fair consideration and study of the question at issue by candid, impartial minds. No one can take up a single article that has appeared in THE ELECTRICAL WORLD and say that it was influenced by spite, spleen, bribery or a desire to misrepresent for purposes of deception. This paper has grown to be what it is by the universal recognition of our intention and endeavor to publish the truth about anything so far as we could learn the truth and just as soon as we could get at it. As to the Drawbaugh case, we have simply to say that we have read every word of evidence and argument that has been made available, and have carefully studied all the drawings and explanations of Mr. Drawbaugh's apparatus. We are now content to await the decision of the court to which the question has been submitted. Meantime we propose to pursue the conservative policy it has always been our aim to cultivate. There are other claims besides Drawbaugh's in the field, and until some satisfactory determination is arrived at with regard to them, the Bell patents remain the only ones to be seriously taken into account. Whether the Bell Company enjoy their monopoly rightly or wrongly is a question for the courts and not for us to pronounce upon; and for that matter we pity the courts by which the interminable evidence has been heard. All we have to say on the Bell monopoly is that the company are enjoying a reasonable reward for their enterprise and ability in developing the rights secured to them by the government under the patent laws of the country. The chances are that but for Professor Bell and his able co-workers the world would to-day be without the benefits of telephonic service, and Drawbaugh and the others would be unheard of.

The editorial "we" is by no means a fictional conventionality. The opinion it covers is often that of a dozen men of mature experience and ripe thought, based upon searching investigation and a wealth of material accessible at a moment's notice. Hence, when a correspondent pits himself against that "we" he often mistakes the measure of his strength, and also misattributes wise caution to the timid truckling of subservience. If these correspondents who berate us were to go as often behind the scenes of public affairs as most editors and writers for the press do, they would not jump so hastily at their conclusions, but would know that editors generally have sufficient and legitimate reasons for their caution. The presumption, too, that the under dog in the fight is necessarily in the right because he gets the worst of it, is often weak and untenable, just as the presumption is that because the upper dog is successful he is therefore right. There are some papers that distinguish themselves by throwing the wing of their protection over large and wealthy institutions that are attacked, but we are inclined to think that they are not thanked very effusively by those whom they patronize.

It is nothing unusual for us, after publishing the news of some invention or discovery, to receive letters the writers of which claim that they antedated everybody else in the direction named. As we read their claims we sometimes wonder how it is that telephones, electric lights, electric motors, electric railways and a host of other applications were not in full swing twenty-five years ago. We have on file one letter, in which Professor Morse is charged with downright theft of the electric telegraph from the father of our correspondent, and we have more letters filed, in which the most extravagant claims are made with respect to other and later apparatus. It would be strange indeed if we were not cautious, even skeptical, when new and important claims are sprung on the public as soon as a certain invention becomes valuable. More than that, we know of cases in which the temptation has been held out to the editor to participate in the "bleeding" of the wealthy holders of good patents. One man, who wished to be bought off by the Bell Company but failed to show any good reason why, had a charming scheme, in the working of which we were invited to participate, the object of which was to place him in a position to obtain an interference whenever any good electrical device was patented. We are not aware that this patent-wrecker has yet succeeded in his designs.

It is very easy to fling about charges of bribery and corruption. In this case we think that our readers will treat them for what they are worth. At any rate, we are indebted to our correspondents for the expression of their thoughts about us, and for the opportunity they give us of expressing our thoughts in return on one or two points of journalistic honor and decency. They give us also the opportunity of calling special attention to what is said by the leading English journal, *Engineering*, which certainly cannot be included in the category of Bell monopoly hand-organs. It states erroneously in its issue of March 21, that the case in the Circuit Court of New York has been decided in favor of the People's Telephone Company—referring evidently to the proceedings at Philadelphia. But in spite of its misapprehension as to the decision of the court, it says: "The series of instruments produced as Drawbaugh's are remarkably complete, and so perfectly anticipate the apparatus now in use that we cannot help a suspicion as to their genuineness. The likeness is, if anything, too close, and Drawbaugh's work too obviously forestalls that of recognized inventors." That can hardly be palatable to the supporters of Drawbaugh, but it goes much further than our conservative and impartial utterances on the subject ever went.

In making this expression of our views we do not in any way reflect upon the honor or veracity of the various rival telephone companies, and we may state that so far there has not been the least complaint from those companies that we have treated them unfairly. The news about them has been published by us from time to time, without coloring or twist. If any one is in possession of exclusive "inside" information that we cannot obtain, or believes that which does not satisfy us altogether, we have no objection to offer to his enthusiasm. All we propose is to secure to ourselves the right to exercise liberty of opinion and judgment in a fair and conservative manner, and our readers will, as heretofore, rest in the confidence that our news is given without bias, our comment without favor.

MODEL FARMING.

Attention was called recently in these columns to the absence of electrical applications for agricultural work. In the present issue we publish an interesting communication from Mr. James Cheesman, the agricultural chemist, dealing with the subject of electrical appliances on the farm. His discussion of this important matter will be read with interest, and the article will be found pregnant and suggestive by all thoughtful readers. But we cannot refrain from expressing our opinion that Mr. Cheesman's views are a little too roseate and sanguine. To begin with, we question whether average farm life and labor is capable of the high organization necessary to a successful working of his scheme. Individual farmers, here and there, are energetic and enterprising, neither too strongly rooted in old prejudices nor too deeply rutted in old ways, to try better modern methods; but it would be very difficult to get the collective farmers, twelve or twenty in a small district, to join hands and purses in the manner suggested. Then we believe that Mr. Cheesman has fixed the probable consumption of coal very low and the probable return in available energy very high. It is open to doubt, also, whether the complete plant could be laid down for anything like $20,000, the outlay including not only a central station, with engines and dynamos, but several motors widely scattered, and extensive wiring, as it might not be deemed wise to complete the circuits by the earth. Moreover, Mr. Cheesman takes it for granted that electric lights would be run, and their installation and tending would be an additional expense. He allows only $1,800 for labor, but he could not get the services of a single competent electrical engineer for that, and such a plant would require the supervision and care of more than one intelligent man.

Apart from these considerations the plan has some merits, and if it were tried on the large Western farms of the Dalrymple type it would, we think, pay handsomely.

THE PROPOSED ELECTRICAL INSTITUTE.

We mentioned briefly last week that a movement had been started to found a national electrical institute. This week we are enabled to print the call or prospectus of the institution, and it appears elsewhere in our columns.

The support that has been accorded to the proposition by leading men is nothing short of remarkable. The list we give of the names of those who were within immediate reach of the projectors and to whom the call was therefore first submitted, is a representative one, and such support would of itself stamp the society as worthy of support and as sure of success.

A society of this nature has become an absolute necessity, and the present endeavor to establish it is most timely and judicious. The objects recommend themselves to the favorable consideration of all interested in the welfare, progress and development of electrical science and industry, and should they be but partially secured the gain will be of incalculable benefit.

The day fixed for the preliminary meeting is May 12, when, of course, the name of the society, subscription, conditions of membership, officers, and other matters will be duly considered. If measures are then actively pushed forward the society will be an accomplished fact and in prosperous existence before the opening of the International Exhibition at Philadelphia and the arrival of the hundreds of European savants who promise to visit us this year.

INSULATORS AND INSULATING COMPOUNDS.

The subject of insulators and insulating compounds is certainly one that does not lose in interest. It remains of foremost importance in these days of telephony, electric lighting and multiplied telegraph wires. Our columns give evidence this week of the current interest in the matter. The letter from Mr. Bassett, of the Chicago Insulating Company, deals with a point raised in Mr. P. Atkinson's recent article on the subject and the contribution from Mr. J. F. Kelly calls attention to the merits of the Lewis Self-Binding Insulators. These insulators are practically unknown in America, but we understand that they are now obtainable, as the Electrical Supply Company, of this city, has imported a quantity of them.

Washington Illuminated by Electricity.

Washinghton now presents a most brilliant spectacle at night. An appropriation was made recently by Congress to be used by the local Brush-Swan Electric Light Co., of which Mr. A. A. Hayes is the president, in lighting the Capitol, the Smithsonian Institution and the Washington Monument. Twelve lights have been put on the "tholus" at the top of the dome of the Capitol, the height from the ground being 285 feet. As the Capitol itself stands at a considerable elevation, the effect produced is very striking, and the light can be seen many miles off. One light has also been placed in the rotunda of the Capitol. The ten lights on the Washington Monument are over 400 feet in the air, and are higher than those on any other building in the country, perhaps in the world. Six more lights are placed on a mast on the highest tower of the Smithsonian building. These three centres of illumination are within the radius of a mile, and thus diffuse a soft and pleasing light in the upper air. Around each group of lights the gas lamps are extinguished. The circuit on which the lights are placed embraces nearly five miles of wire, starting from the station on Second street, between B and C. One dynamo is used at present. It is proposed, when the monument at last stands complete, to place a light at the top.

The Privacy of Telegrams in Canada.

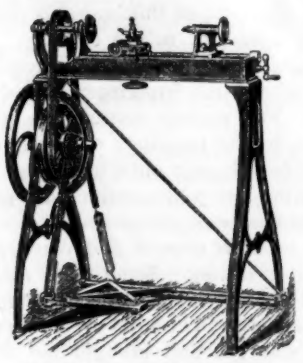
The Dominion has been considerably agitated over a recent attempt to bribe some of the Provincial Legislators on the part of men who were conspiring to overthrow the administration. In order to obtain important evidence, it was necessary that certain telegrams should be produced. On this point a dispatch of March 28, from Toronto, Ont., says: The conspiracy case was again before the Police Court to-day. Mr. H. P. Dwight, general manager of the Great Northwestern Telegraph Company, said he had received a subpœna from the Superior Court yesterday calling on him to produce all messages sent by Wilkinson and Bunting to Ottawa since Jan. 22 last. He had looked the messages over, and found that nearly all of them referred to important private matters having no apparent connection with the conspiracy, and he submitted that he was not compelled to produce such messages. They were in his possession simply as a servant of the company, and in failing to produce them no contempt or want of respect was intended as to the authority of the Court. He was simply acting from a sense of duty in the matter, taking into consideration the penalty to which he would be subjected by law in divulging messages, and also the express order of the company forbidding him to do so. He submitted that the court had no authority to commit him, and should he obey its command and produce the messages the court would have no power to protect him from the penalty to which he would be subjected. He also objected that the court had no power to issue a subpœna *duces tecum*. After some discussion by counsel the magistrate said that he was quite satisfied that he had no power to commit Mr. Dwight. The Crown Attorney then said that he would apply to the Court of Queen's Bench for an attachment against him.

A Lathe for Experimenters.

In this country the electrician is above all things a practical man. It is not very often that he can boast of academic training or of intimate acquaintance with the higher mathematics, but he can generally explain how a process or an invention works and is able to show it in operation under his own guidance, his education having been quite as much that of hand and eye as of brain and tongue. He delights in experiments, not infrequently makes his own apparatus, and has more than once distinguished himself by happening on results that are fraught with incalculable good to the world at large, but that would probably never have come to light through the intervention of mathematical formulas wielded by men whose study of electrical subjects has had an exclusively scholastic development. While this country suffers in some respects from the lack of men of the latter type, it certainly has no cause to complain that its practical electrical inventors are few.

There being an undeniable taste among American electricians for experiments and practical tests, it follows that they require tools and appliances of all kinds. An important item in the mechanical outfit is the lathe, a tool from which a great quantity and variety of work is expected. We illustrate in this column the foot lathe for amateurs and experimenters submitted to notice by the Narragansett Machine Company, of Providence, R. I. It is one of the most serviceable we have seen, and would enable many an inventor to put his ideas to trial. This lathe swings 8 inches over the bed, 4½ inches over the carriage, and is 18 inches between the centres. The spindle has taper bearings arranged to take up wear, and admits of a 5-16 wire being passed through it. Both centres are taper-fitted and guaranteed to be in line; that of the tail-stock is self-discharging. A slide-rest or tool-carriage travels the entire length of the bed, and can be readily disconnected from the feed-screw; it is provided with a cross-slide, having 2½ inches travel, that can be set at any angle for turning or boring tapers, etc., or instantly removed and a T rest-holder or other device substituted. Owing to the introduction of the slide-rest, the difficulties of steadying the tool and guiding it by hand while using the foot are obviated. Amateur workers in metal will thus find their troubles lessened and their labor lightened. The manner of supplying the power is also advantageous. The lower pulley is connected with the cone-pulley on the spindle by a belt in the usual manner. Two steps are provided for change of speed. The pulley on the spindle has a heavy balance-rim, which gives a very steady motion to the spindle. On the lower pulley shaft is a clutch, which, when the treadle is pressed downward, engages with and gives motion to the pulley. On the stopping or returning of the treadle, the pulley continues its rotation. The strokes may be long or short, quick or slow, at the will of the operator. The treadle is raised and balanced by a common spiral spring.

With this foot-power a much greater speed can be obtained with less effort and motion of the body than is usual. It is substantially constructed, and not liable to get out of order. It is always ready to start when the



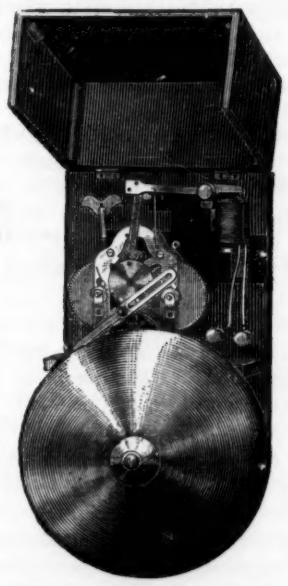
IMPROVED FOOT LATHE.

foot presses the treadle, and always starts in the right direction. The foot can remain at rest on the treadle while the machine continues to run, thus avoiding the motion of the limb necessary in all crank motions even when power is not needed. The last feature is one that all will appreciate, as it will enable them to perform the most delicate manipulations of the lathe with ease and certainty.

It can further be said that the finish of the lathe is high in all the parts. A great recommendation is that parts are interchangeable. Further particulars can be obtained from the makers.

Improvement in Electric Gongs.

Go where one will to-day, the tinkle and alarm of the electric gong is to be heard. The uses to which this electrical appliance is devoted are innumerable, ranging from the railway signal to the "tocsin of the soul, the dinner bell," and from the telephone call to the hotel annunciator. The demand for these conveniences of modern life is increasing, and there has always been more especially a large market for a low-priced striking gong to be used in hotels, factories and other extensive buildings in connection with fire alarms, burglar alarms, signaling and other kindred purposes. The gong illustrated on this page was made to meet such a demand, by the Redding Electrical



THE REDDING CO.'S GONG.

Company, of 30 Hanover street, Boston. Large numbers have been sold, and the sale is steadily increasing.

The recent disastrous fires in hotels have made their mark on legislation, and the laws of Massachusetts now require hotels throughout the State to adopt a system of fire-alarm gongs, to awaken the guests in case of fire. Naturally preference is given by all intelligently informed on the subject to electrical alarms, and the Redding company have on hand several contracts for installations in prominent hotels. One gong is placed on each floor and connected up to a switch placed in the office. Should a fire break out, the circuit is closed by means of the switch, the gongs give 300 blows, and the soundest sleeper among the guests, even if he were one of the famous Seven, could not fail to be aroused and stimulated to very urgent curiosity as to why his midnight slumbers had been disturbed. The system is highly successful in operation, and virtually removes some of the great perils hitherto attached to life in our caravanseries. One of the last hotels fitted up by the Redding company with gongs is the well-known Vendome, perhaps the finest in Boston.

When used as a burglar alarm the gong is accompanied, if desired, by a connection that keeps the bell ringing, once in operation, until it has struck 300 blows or is stopped by means of a switch, the location of which is known only to the occupants of the house or store. This is a valuable improvement, as the burglar is prevented from stopping the "horrible alarum" by closing the door as soon as he has gained entrance.

This gong is also valuable for railroad signals and for use in connection with district telegraph boxes, for fire alarms in factories, and in small towns and villages where they are unable to go to the expense of a first-class fire alarm. It can, furthermore, be used in connection with telephones in factories and other noisy places where the ordinary bells would not be heard.

The firm inform us that the success of this gong has already led to infringement. They are determined, however, to protect their rights. All the genuine gongs will be found to bear the stamp of the firm, with the date of the patent under which the article is manufactured.

Mr. Jay Gould's Junketing in Cuba.

Mr. V. F. Butler, the estimable manager of the Telephone Exchange at Havana, sends us the following account of the recent visit of Mr. Jay Gould to the Ever Faithful Isle, and of the impression created there by the great financier:

Mr. Jay Gould was in Havana in his yacht "Atalanta" last week, accompanied by Mrs. Gould and the four children. All were very much pleased with Havana, the climate being such a delightful change from a Northern winter.

Mr. Gould and his sons visited our exchange and were greatly pleased with it, and complimented me very highly upon our perfection of arrangements and good service; also on our success financially, as we are paying 10 per cent. at present and hope to pay much more this year, in consequence of the increased and increasing number of subscribers and reduction in construction and working expenses. There was a rumor here that Mr. Gould intended to go in for some of our stock; in fact, swallow up all he could get hold of. How true it is I cannot say.

By Mr. Gould's kind invitation, the Captain-General Castillo, and his lady and staff, accompanied by myself and wife, visited the "Atalanta," and were very kindly received by Mr. Gould. I had the pleasure of acting as interpreter for his Excellency, who was very much surprised and delighted at the wonderful beauty and perfection of that queen of yachts.

Mr. Gould's modest, retiring, agreeable, unpretentious demeanor left a most favorable impression here. The Havana people expected that a person possessing such great wealth would have made a great splash and show ostentatiously, and they were much surprised to find an affable, little gentlemanly person, who chatted politely and frankly with every one, and rode about Havana in a street cab, or strolled about the streets, looking at the shops and the niggers, the fruit, and the old-fashioned houses and churches. Mr. Gould looked very well and young, and as happy as a boy out from school for a holiday. He was evidently enjoying himself and having a good time. They left here for Matanzas to visit the celebrated caves, and afterward may go to Santiago de Cuba and various other interesting ports. The press of Havana write some very favorable notices about Mr. Gould, his great financial talent, business capacity, clear head, energy, wealth, besides his private qualities as a good husband, father and friend.

Improved Wheatstone Punching Instruments.

The punching instruments in the Wheatstone department in 195, by means of which messages are prepared for automatic transmission, have recently been supplied with pneumatic pressure. Heretofore the operation of punching the paper has been quite arduous, as considerable force is required to perforate the paper with the precision which is essential. The old punching instrument, with its three discs, is still retained, but it is now placed within a tight-fitting iron frame. A small portion of the upper part of this frame is boxed in, and the air pressure is allowed to enter the box at one of the sides. Three cylindrical pistons protrude from the bottom of the box, and these pistons are placed directly over the discs of the ordinary punching instrument. The iron frame-work is also furnished with three keys, representing the three discs of the punching apparatus, and these keys control, by means of a stiff wire, three valves within the inclosed box. A slight depression of one of these keys thus opens its corresponding valve and allows the air to rush in, which forces the desired piston down with a quick, strong motion upon the disc beneath it, causing it to perforate the paper. The air pressure at present employed is six and one-half pounds to the square inch.

DEATH OF A MEXICAN TELEPHONE PIONEER.—Antolin Carrera, foreman of the Mexican Telephone Co., and formerly of the Ca. Electrica de Habana, died recently in Mexico of consumption. He was well known to all the American telephone men who visited Mexico.

Electrical Interests in Baltimore.

One is never more struck with the growth and extent of electrical industries and applications than when he drops into any city and proceeds to call upon the companies, firms and individuals interested in the various lines of business. The work instead of lessening seems to grow, it swells to tremendous proportions, and the time at one's disposal is gone before half the plans mapped out ahead have been disposed of.

The editor of this paper has recently made a trip through the cities of the Atlantic seaboard, to ascertain the condition and prospects of electrical business generally. The impressions he brings back are of a very cheering and satisfactory nature, and he has learned many facts of an interesting character. It would be impossible to give all his gleanings in one issue, and Baltimore, therefore, receives exclusive attention in this number.

The Brush light has been very successful in Baltimore and the local Brush Electric Company is on a dividend-paying basis. It now runs about 400 lamps. Gas is down to $1 per 1,000 feet to private consumers, a rate said to be lower than that of any other city in the country. Before the starting of the electric light company the rate was $2, and the city authorities are still paying $1.80 per 1,000 under a five years' contract. The cut in prices is due, however, to competition between gas companies and not to an effort to fight the new illuminant. The electric light rate is $15 a month for supply until 12 o'clock midnight, and 75 cents for an all-night light. The General Manager of the company is J. F. Morrison; Secretary and Treasurer, H. C. Tudor; Superintendent, David Evans. The works have been twice enlarged since they were opened. The plant includes five Buckeye engines averaging about 150 h. p., and the capacity of the station is from 800 to 1,000 lights. The company has paid two semi-annual dividends of 3 per cent. each on its capital of $500,000, one in August, 1883, and another in February, 1884. The light grows steadily in public favor.

The Edison Company in Baltimore have just finished a plant for O. Hammond, Jr.'s artificial ice manufacturing establishment, North Packer street. It is an isolated plant of fifty lights, and in connection with it a very interesting little experiment was recently made of freezing one of the lamps. An ordinary globe was imbedded in ice, its wires and socket being thoroughly insulated and protected by rubber tubing and insulating compound. A feeble current was passed through the lamp so as to keep it slightly warm while the globe was being frozen. After it had been completely frozen the lamp burned satisfactorily and attracted considerable attention on the part of the public and the press. Mr. D. D Mallory has just had his new residence on Eutaw Place wired for the Edison system. It is probable that a gas engine will furnish the power. The company is now engaged on a plant of 150 lights at Union Docks, for the Baltimore Steam Packet Company. "Cluster" lights will be placed at intervals in the yards and single lights on the gangways leading to the steamers. Clusters and powerful reflectors will also be placed along the water front. The company claim to have demonstrated that the mild yellow glow of an incandescent light can be seen further in a dense fog than the insistent blue glare of the arc light. Mr. H. A. Clark is Manager of the local Edison Company, and Mr. J. E. Glacken Superintendent of Wire Work.

The *Valley Sentinel*, at Carlisle, Pa., is, through the Maryland Agency of the Edison Company, having an Edison plant installed to light the *Sentinel* Building. The Susquehanna Water Power and Paper Co., at Conowingo, Md., has decided to light its paper mill by the Edison system. The installation will be ready to start by the time the works are ready, which will probably be about the middle of April. The mill is located on the right bank of the Susquehanna, about ten miles from Havre de Grace. The site was selected on account of the water power, and it is asserted that the company can get 1,800 horse-power from the river. The lighting plant is substantial and complete in every respect.

In addition to these companies, the United States Company is represented in Baltimore, Messrs. Davis and Proal being the agents. It has not done much business, owing to the fact that the Brush have obtained a strong footing and secured a large contract for city lighting. The United States Company has good hopes of more business, however, especially as it is believed that larger contracts will be given out for lighting the city by electricity.

Last week the Maryland Overland Telephone and Telegraph Co., of Baltimore, was enrolling subscribers at $60 a year on single lines, and $50 a year with two on a line. The present executive offices of the company are in the Keyser Building, 23 and 25 German street. Mr. John A. Blattau, who is General Manager, was formerly connected with the Chesapeake & Potomac Telephone Company. We did not learn what success the new company was meeting with.

The telephone business in Baltimore is steadily on the increase. Mr. Archibald Wilson, Jr., a deservedly popular man, who has been connected with the Chesapeake & Potomac Telephone Company since its organization, has recently been appointed Superintendent of the company in the place of Mr. F. M. Lytle, who has resigned. Mr. Wilson is well known among telegraphers, having been for several years manager of the Baltimore Western Union office.

The various telegraph companies are well represented in Baltimore, under good and vigorous management. The handsomest and most elaborate office, of course, is that of the Baltimore & Ohio, in the building of the B. & O. Railroad Company, corner of Calvert and Baltimore streets. A large quantity of business is relayed at this point. The Western Union Company's business is large in Baltimore, and is conducted in a spacious and well-ventilated office. The Bankers and Merchants' Company is also doing a good business in convenient quarters, while the Postal Company has just opened a very fine office and is already doing a fair business. The District Telegraph Company is also in a prosperous condition, and Baltimoreans cannot complain that they suffer from lack of telegraphic facilities.

Mr. J. Frank Morrison, of Baltimore, is probably one of the best-known operators in the country. He was for many years night manager of the Western Union office, Baltimore, and afterwards Superintendent of Telegraph in the same city. For several consecutive years he was chosen delegate to the meetings of the T. M. B. A. He has made many friends, not only by his affable manners and general bearing, but by his readiness as a public speaker. Of late years he has been prominent in local politics at Baltimore, and he is at present Jail Warden, discharging highly responsible duties. Some time ago suits were brought against him for alleged malfeasance in office, by his political opponents. The suits were apparently based on trumped-up charges and brought not for the public welfare, but to injure Mr. Morrison's reputation and prospects. These suits, the preparation of which occupied several months and the hearing not less than ten days, were dismissed on March 27. The accusations were that when he was Fire Commissioner, Mr. Morrison over-purchased goods for the Fire Department at exorbitant prices. The evidence in the case showed that the rates paid were reasonable for the quality of goods furnished, and that everything bought was actually wanted.

The trial created considerable excitement and interest at Baltimore, and the bitter opponents of Mr. Morrison sought strenuously to substantiate their charges. After the verdict was rendered, Mr. Morrison received congratulations personally from his numerous friends, and letters and telegrams of congratulation poured in from well-known telegraphers and electricians in other cities. There are many of our readers who will be glad to hear the news.

The Viaduct Manufacturing Co., whose factory at Relay Station was destroyed by fire a few months ago, has just finished its new building. The old factory had been originally a flour mill, and the new one has superior arrangements in every respect, being designed and fitted up with special reference to the requirements of electrical manufacturing. The old factory was insured, so that with the money received the new place has been erected, and the loss is practically confined to the orders that would have been executed but for the delay of three months, during which time nothing could be done. Messrs. Davis and Proal have paid very great attention to storage batteries, and their time and money have been wisely invested. They are prepared to turn out storage batteries in large quantities, and as soon as the unfortunate litigation on the subject is settled they will be able to meet any demand. They already have some batteries in practical use in Baltimore and will soon put in quite a number more. The company is also doing a large business in telegraph, telephone and electrical supplies, and has sanguine expectations concerning the Continental Cash Car for use in large retail stores, and already widely introduced. This device is not electrical.

One of the newest firms in Baltimore is that of W. R. Pope & Co. Mr. Pope was formerly connected with the Metropolitan Telegraph and Telephone Co., of New York. The firm are manufacturers of all kinds of electrical supplies, and do a considerable business in telegraph, telephone and other requisites for the various companies of that nature, as well as for district telegraph companies. They also make burglar alarms, annunciators, etc.

The Southern Electric Co., in which Messrs J. F. Morrison and D. H. Tuxworth have a controling interest, is doing an extensive business in electrical supplies, and has filled several large contracts for the city.

The Hahl Manufacturing Company, of 13 Mercer street, has given most of its time lately to the perfecting and manufacturing of a new clock worked in an ingenious way by oil. Several of these clocks are already in use in Washington and Baltimore, and all of them are said to give thorough satisfaction.

Mr. Ottmar Mergenthaler, who started in business for himself some time ago in Bank street, is engaged in making electrical and mechanical apparatus, principally models and experimental work.

A WISE COMMITTEE.—The Committee of the Massachusetts Legislature that has been considering the question of aerial electric light wires has come to the sensible conclusion that it is not expedient to compel the companies to put their wires under ground.

Early Ideas of the Telephone.

Great interest always attaches to the process of tracing back to their origin the conception of new ideas and inventions. We give below two of the latest "treasure trove" items in connection with the telephone:

In a fairy tale written by the Brothers Mayhew, published in London in 1847, and called "The Good Genius that Turned Everything into Gold," occurs this passage:

> "Let their voices be heard
> At a distance no voice could reach!
> And swiftly as thought:
> Let the words be brought
> And the Lightning endowed with speech!

"As the Queen looked up, she saw suspended above her a series of long metallic threads, which ran through the air till they were lost in the distance.

"'You wished to speak with your husband,' said the little Bee. 'I shall be pleased to convey any message you please to him; and as I knew your business was immediate and important, I thought the best plan would be to send it by lightning for you, so that you might receive an answer by the next flash. What shall I say to him for you?'

"'Ask him if he needs the fairy dress?' eagerly cried the princess.

"'It is done,' said the Bee.

"And instantly the words went tearing through the atmosphere on the wings of the lightning messenger. And swift as a sunbeam the answer returned."

A little more than 50 years ago, says the Springfield (Mass.), *Union*, the employés of the Arms Shoe Manufactory at South Deerfield beguiled their leisure hours by kite-flying. Kites large and small were sent up daily, and the strife was to see who would get the largest. The twine which held them was the shoe thread spun and twisted by the ladies of the village. One day to the tail of the largest kite was attached a kitten, sewed in a canvas bag, with a netting over the mouth to give it air. When the kite was at its greatest height—some 200 feet or more—the mewing of the kitten could be distinctly heard by those holding the string. To the clearness of the atmosphere was attributed the hearing of the kitten's voice, and no telephonic patent was applied for.

The Telephone in Michigan.

An interesting review of telephonic growth and progress in Michigan appeared recently, as follows, in the Ann Arbor, Mich., *Register:*

The growth of the telephone system in Michigan is something almost marvelous. Five years and a half ago there were hardly a dozen instruments in the State; to-day the telephone and telegraph construction company have thousands of subscribers and miles upon miles of wire. Before August 15, 1878, it was impossible for business men to communicate within a distance of one block without the aid of a messenger, now the Ann Arbor merchant can talk with parties in every part of the city and county and in various sections of the State.

In no county of the State, perhaps, are the means of communication so perfect as in Washtenaw County. So well distributed are the exchanges that every important occurrence within its borders can be made known at Ann Arbor in less than 40 minutes after it takes place. The first telephones in the county, as a *Register* representative learned in an interesting conversation with Manager Keech, were put in by the Cornwell Paper Company of Ypsilanti, in February, 1878. They were the common hand 'phones used before the application of the Blake transmitter, and connected the residences of the Cornwells, their office and the mills at Lowell. They operated very satisfactorily and proved of great service.

The first Bell electric telephones employed in Ann Arbor were located at the office and mills of Swathel, Ailes & Kyer and in the Ferdon lumber yard. They were constructed in the summer of 1880, and for a long time were the only ones used in the city. Finally, in January, 1881, after much hard work on the part of the projectors, an exchange, having twenty-five subscribers, was started. This was followed by the Ypsilanti exchange, July, 1881; by that at Saline, June 1, 1882; Dexter, June 23, 1882; Milan, May 1, 1883; and Manchester, July, 1883. The exchanges at these several places have grown constantly since their establishment, until at the present time there are 174 instruments in the county at large. Of these Ann Arbor has 93, Ypsilanti 55, Bellville 1, Foster's 1, Dexter 5, Delhi 1, Birkett 1, Boyden's 1, Chelsea 1, Manchester 8, Saline 2, Mooreville 1 and Milan 1. To connect these several places 75 miles of wire are needed, exclusive of the Jackson, Adrian, Ann Arbor and Detroit through wires, and besides this there are 125 miles of exchange wire connecting subscribers with the different offices.

How the "Citizen" Was Printed.

Last week we gave some particulars as to the way in which the Ilion, N. Y., *Citizen* was printed by electricity. We are now able to supplement that by the following communication from Mr. George W. Weaver, the enterprising publisher of that paper:

"We ran a 10 light Parker dynamo by power from a steam engine some 15 or 20 rods away, and from it conducted our power to a Parker motor over a ¼ in. insulated copper wire. (Two wires of course were used). From a six-in. pulley on the motor we belted to a 26-in. pulley on

our shaft and by it ran three large cylinder presses, could have easily added our three job presses, but had no one to tend them. We had plenty power and too much speed, hence we reduced the speed, being able to spare the consequent loss in power. To do this we strung back and forth about 20 yards of small copper wire strands parallel and about two inches apart. Then we severed the main wire. and to regulate the speed ran the current through this small wire; through all of it if we wanted *less* speed and one or two strands for more. We also suspended a couple of Parker lamps near by. and for experiment used our surplus power to light these. Then by a coil of wire (two ends exposed) we at times cut the current from our motor entirely. It would at once stop, and the lamps to which the current was thus diverted would respond instantaneously with their blinding light.

"The motion we obtained was exceedingly steady and very satisfactory, although we did it only for experiment. I think it not far distant when far-away power will be successfully brought to our doors by wire."

Patent Decision Affecting Electric Lighting.

"E. B." sends us the subjoined:

"A cablegram was received a few days ago at the offices of the Bernstein Company in Boston, stating to the effect that the petition of the German Edison Company, asking to make the Bernstein light patent subordinate to and dependent upon the Edison filament patent (No. 12,174), has been rejected by the German Patent Office, and the patent was granted to Mr. Bernstein as covering a different system, and, therefore, one independent of the other patents.

This decision, although entirely in accordance with the merits of the case, brings to the foreground the eventual possibility of two monopolies, viz.: the one using the filament, and the other the Bernstein tube; and although the filament lamps have enjoyed up to this time a better financial backing, the greater efficiency of the Bernstein lamp, as recently reported upon by the Vienna Commission, has already aroused some noted European capitalists to develop the light of the future; and we understand that the policy of the Bernstein company, which thus far labored under the prejudices aroused against them by the defunct Gramme 'ring,' will in future be aggressive and in keeping with the high opinion its system earned in Europe."

New York Electrical Society.

The regular meeting of the New York Electrical Society was held on the 2d inst., at the Cooper Union, Room 24. Mr. N. S. Keith was elected third vice-president in the place of Mr. E. A. Leslie resigned. Mr. C. H. Small was elected financial secretary.

The president, Dr. P. H. Vander Weyde, introduced the subject for discussion, electro-motors, by classifying them, first, electro-magnets attracting soft iron armatures; second, steel magnets attracting electro-magnets; third, electro-magnets attracting electro-magnets.

Major L. M. Sabin described and exhibited his new motor, which is of the first class. It was unfavorably criticised by Mr. N. S. Keith, who also made some remarks upon the efficiency of motors generally. He said that motors of the first and second class had been abandoned for those of the third class, resembling Gramme and Siemen's dynamos, from which very much higher efficiencies had been obtained.

The committee on the Jones award reported that the members will be informed by printed postal cards as to the terms of the competition. The committee on location reported that permanent quarters for the society had been secured in the Cooper Union. This news has given general satisfaction.

The Joel Lamp.

To the Editor of The Electrical World:

SIR: Allow me to point out a slight error in your article on the "Pilsen System" which I now represent here. In regard to the Joel semi-incandescence lamp it should be 40 ampères instead of 50 ampères, the difference of potential at the terminals being 12 volts. In publishing this you would greatly oblige.

NEW YORK, April 3. ALF. PFANNKUCHE.

Insulating Compounds.

To the Editor of The Electrical World:

SIR: Mr. Philip Atkinson, in his article on Insulators, in your issue of March 15, says: "Compounds of asphaltum and marble dust, and shellac and marble dust, have high insulating qualities, and do not easily collect moisture on the surface; but they are hard and brittle, like glass and porcelain, and hence unfit for lathe work."

Mr. Atkinson could not have investigated this subject closely, or he would have been more precise in his statement. What he says regarding these compounds which are exclusively used by the Chicago Insulating Company is true, except the last statement, that it is "unfit for lathe work." This material has been worked on an ordinary lathe with hard steel tools, and no particular difficulty was experienced in working it. With special tools, or with emery wheels, there is no difficulty in working it into any desired shape. The high insulating qualities of these compounds make them specially desirable.

F. S. BASSETT, Sec'y,
The Chicago Insulating Co.

CHICAGO, ILL., March 25.

THE TELEGRAPH.

PROGRESS OF THE BANKERS AND MERCHANTS' CO.—This company now expects to have 10,000 miles of pole line and 100,000 miles of wire before June 1.

RUMORS OF CONSOLIDATION.—A report has been current that the Baltimore & Ohio Company has made a favorable offer of consolidation to the Postal Company.

THE DEATH OF AUGUSTUS SCHELL.—Resolutions of respect were adopted last week by the Board of Directors of the Western Union Company on the death of their colleague, Augustus Schell; and several of them attended his funeral, on the 29th.

THE MACKAY-BENNETT CABLE.—Mr. J. W. Mackay says there is no trouble about the Mackay-Bennett cable scheme. One cable will be landed at Boston by June 15, and one at Fire Island October 15. The contracts are made, and all the company has to do is to pay the bills when the work is done. The delay in the work is a matter for the contractors.

DEATH OF GEORGE W. DANIELSON.—The death is announced of George W. Danielson, a well-known journalist, and editor of the Providence, R. I., *Journal and Bulletin*. Mr. Danielson was a director of the Rhode Island Telegraph and Electric Company, and for a number of years, down to the time of his death, president of the New England Associated Press.

A CABLE FROM FLORIDA TO THE WEST INDIES.—The certificate of incorporation of the United States & West India Cable Company was filed in New York on March 28. The cable route of the proposed company is between New York, the coast of Florida and the West Indies. The capital stock is $2,500. The corporators are James C. Jewett, Joseph Emerick, N. B. Perrity, Hermann Kobbe, and Nicholas Brandt.

WESTERN UNION TAXES IN PENNSYLVANIA.—The Dauphin County court, Pa., was occupied nearly all of March 26 in hearing arguments in the case of the State against the Western Union Telegraph Company, which is charged with a tax on stock dividends amounting to nearly $1,500,000. The company several months since offered to pay the State $500,000 to settle the case, but the proposition was refused. The Court reserves its decision.

ANOTHER WESTERN UNION DEFEAT.—Judge Baxter, of the United States Circuit Court, Cincinnati, on April 3 ordered a decree to be entered in the suit of the National Telegraph Company against the New York, Chicago & St. Louis Railway Company, enabling the National Telegraph Company, now controlled by the Baltimore & Ohio Telegraph Company, to open its lines between New York and Chicago over the West Shore & Nickel Plate roads at once for business.

THE B. & O. AT BUFFALO.—The injunction recently obtained by the Western Union Telegraph Company restraining the National Telegraph Company, owned by the Baltimore & Ohio Company, from using the West Shore & Nickel Plate wires, having been dissolved by Judge Wallace, of the United States Court, the National Company issued orders, on April 2d, to have operations begun at once. The offices at all points on the line will be opened immediately. The work of stretching the wires in this city, which has been in progress for some time, is completed, and the office here will be open for business to-morrow.

BUCKET SHOP QUOTATIONS.—The members of the New York Stock Exchange Governing Committee were called together on 2d inst. for the special purpose of considering matters relative to the dissemination of quotations from the Exchange trading-room. A proposition was made to the Exchange recently by another company to do the work which is now performed by the Gold and Stock Telegraph Company. This proposition has been considered by a sub-committee, and some action was expected. Officers of the Exchange, however, stated on Wednesday that the matter was not yet in shape to be finally acted upon by the Governing Committee.

THE POSTAL CO. IN WASHINGTON.—The Postal Telegraph & Cable Company have recently opened their office in Washington. Mr. W. H. Allen, of Boston, is the manager, and Mr. M. Duperow, of Toronto, wire chief. The company's wires are placed underground from their offices near the U. S. Treasury to the city limits. Beyond this they are carried upon poles. The whole work is being finished up in a first-class manner and at great expense. The rates from Washington to New York are fifteen cents for twenty words. To Chicago, St. Louis and other points West—twenty-five cents for twenty words. Night rates—fifteen cents for same number of words.

THE TELEGRAPH COMPANIES IN NEW ENGLAND.—President Bates, of the Baltimore & Ohio Telegraph Company, and W. H. Fairbanks, General Superintendent of Construction of the Postal Telegraph Company, were in Boston on April 1, to testify before a Legislative Committee in favor of the proposed legislation giving the telegraph companies the right to construct their lines along the railroad lands; and to give information regarding the progress of these enterprises. It is promised that the Baltimore & Ohio will be ready to do Boston business in from 60 to 90 days, and that the Postal Telegraph Company will have a line there by August.

WESTERN UNION TAXES IN NEW YORK.—The certiorari actions brought in the Supreme Court to review the proceedings of the Tax Commissioners and the Board of Aldermen in 1880 and 1881 for the taxation of the Western Union Telegraph Company and its tenders, the Atlantic and Pacific, American Union, International Ocean and Gold and Stock Telegraph companies and the Manhattan Quotation Company, on their capital stock and also on its poles, wires, etc., considered as real estate, have been discontinued. The company has paid $47,424 43 to Corporation Counsel Andrews, through his assistant, A. L. Cole, who has had charge of the case for the city, and the money has been turned over to the Tax Commissioners. This is the result of a compromise.

THE TELEPHONE.

SALT LAKE CITY.—According to the Salt Lake *Tribune*, that city has 380 telephones in use, connected with the exchange by 375 miles of wire.

ERIE EARNINGS.—The earnings of the Southwestern Division of the Erie Telephone Company for the month of March show an increase of $1,700.

TELEPHONIC RAILWAY SIGNALS IN ENGLAND.—The London & Northwestern Railway Co. have established a system of signaling by means of the telephone upon their branch line of seven miles, from Birmingham to the fashionable suburb of Sutton Coldfield. The experiment is said to be successful. The carriages are also lighted by electricity.

THE DIRECTORATE OF THE GLOBE COMPANY.—The Baltimore & Ohio Telegraph Company, having obtained practical control of the Globe Telephone Company, the Directory of the last named company has been increased by the election into it of Robert Garrett and Howard Munnikhuysen, of Baltimore, and D. H. Bates, H. I. Nicholas and H. R. Duval, of this city. A sub-company, to be operated under the system and franchises possessed by the Globe Telephone Company, has been organized in Baltimore with D. H. Bates as President. The Globe Company controls the Shaw patents and the Meucci priority claims.

TALKING BETWEEN BOSTON AND NEW YORK.—Particulars have already appeared in THE ELECTRICAL WORLD about the metallic circuit between Boston and New York. The Bell Telephone Company experimented with this through line on March 27. The line is built of small copper wire designed for this express use. An ordinary Blake transmitter was employed, and the articulation was as clear as in short-distance telephoning. General Manager Theodore M. Vail and Special Agent T. B. Doolittle, who constructed the line, were the first to communicate, the former being in Mr. Vail's office on Milk street and the latter in New York. Subsequently other Bell directors enjoyed the same pleasure, and declared the experiment a success. It is not improbable that public telephoning between Boston and New York will soon be witnessed.

PASSING A DIVIDEND TO MEET CONSTRUCTION EXPENSES.—The directors of the New England Telephone Company held a meeting on March 27, at Boston, at the Bell Company's office, and voted unanimously to pass the dividend for the current quarter and to use the money for construction purposes. This action, which had been anticipated, says the *Traveller*, is unquestionably the wisest policy that could have been adopted. At the present rate of earning, the company will not be required to pass but one or two more of its dividends before it will be in a position to meet its construction expenses out of its income and also pay its dividends. No formal statement of the company's affairs was presented at the meeting, but the feeling among the directors regarding the future was a very hopeful one. During the past five months the company's subscribers have increased 1,100, and it now has orders ahead for 120 more, 90 of which are in Boston. The present net income of the company is $825,000 per annum.

AFFAIRS IN MEXICO.—General Manager G. L. Wiley, of the Mexican Telephone Company, has resigned his appointment, from the 1st inst. The *Mexican Financier* says: "The resignation will be received with wide regret, for not only is he highly esteemed on account of his personal character and genial qualities, but as a thoroughly trained electrician, he has placed the service upon its present high plane of efficiency. Mr. M. L. Guirand, his successor, is qualified for the post by a long experience with the company, and his extensive acquaintance and connections in the capital will assure many friends for the institution. Mr. D. J. Hobart, from Guadalajara, will act as superintendent under his management. The telephone company will send to Boston on April 1 the first installment of net earnings on its business." The company has sent J. A. Bodwell, an experienced electrician, to Guadalajara to take charge of the exchange there. This exchange is already yielding the company considerable net revenue monthly. One of the best posted men in the affairs of the Mexican company says he believes the company will begin paying dividends Jan. 1, 1885. Important settlements of differences with some of the sub-companies have just been made.

THE ELECTRIC LIGHT.

SACRAMENTO, CAL.—A company has been organized at Sacramento, Cal., to light the city by electricity. Capital stock, $100,000.

FIRE FROM AN ELECTRIC LIGHT SPARK.—The steamer Rebecca Everingham, plying on the Chattahoochee River, Ga., was destroyed by fire on the 3d, and eleven lives were lost. The fire is alleged to have originated from an electric light spark

MERCHANTS IN FAVOR OF IT.—A large number of leading firms in Boston have petitioned the City Council of Boston to increase the appropriation for electric lighting from $94,000 to $125,000, and to increase to that extent the number of lights. They speak most highly of the electric light, and say that Boston was never adequately lighted until its introduction.

STREET PRIVILEGES AT SYRACUSE, N. Y.—The Syracuse, N. Y., Common Council, at its meeting on March 25, gave the Brush-Swan Electric Light Company the right of way in the streets under the provisions of the resolution drafted by the City attorney. Mr. Avery said that the company would put from $50,000 to $100,000 in a plant in that city, and that after organization a local company would be formed and stock sold to Syracuse investors.

MISCELLANEOUS NOTES.

LIGHTNING FATALITIES IN FRANCE.—A report has been communicated to the Academy of Sciences, Paris, by the French Minister of the Postal and Telegraph Department on the thunderstorms which visited France during the first six months of last year. From the full and detailed tables it is learned that in all there were 9 persons and 78 animals killed and about 50 persons and 7 animals injured by lightning.

NEW YORK WIRES TO GO UNDER GROUND.—Senator Daly's bill requiring telegraph, telephone, and electric light wires to be put under ground by June 1, 1885, in cities of 500,000 inhabitants or over came up for final passage in the New York Senate on the 3d, and was passed.

STOCK QUOTATIONS.

Telegraph, telephone and electric light stocks were quoted as follows on Thursday at the Electric, Manufacturing and Miscellaneous Stock Exchange, and at the Stock Exchange:

TELEGRAPH.—Am. Cable, b 56½, a 58½; American Rapid, b 50, a 65; B. & M. Co., b 126; Commercial Telegram Company, a 70; Harlem District Telegraph Co., a 5.50; Bankers & Merchants' Telegraph Co. 1st. mtge bonds, a 85; Manhattan Telegraph, b 10, a 85; Mexican, b 125, a 147; Northern & Southern Tel. Co. 1st mtge bonds, b 79, a 81; Postal Telegraph (stock), b 7.75, a 8; Postal Telegraph bonds, 1st 6 per cent., b 57.50, a 57.75; Western Union, b 70½, a 70½.

Western Union has been weak throughout the week on rumors of a sweeping reduction of rates. Officials of the company knew nothing of the proposed reduction.

Western Union fell off on the 1st to 69¼, the lowest price since the consolidation. The street was full of rumors to account for the course of the market, but the conservative opinion was that Gould was simply coaxing short interest. A large amount of this stock was disposed of that day on account of the Schell estate, whereupon Dr. Norvin Green, president of the company, was at pains to announce that the earnings were larger than ever before. He furnished figures to substantiate this statement. The fact remains that the stock of the company, which earns and pays 7 per cent., which has four millions surplus, sells at 69¼, without much demand for it.

Dr. Norvin Green, President of the Western Union Telegraph Company, states that the laying of the pneumatic tube and the construction of the company's new buildings, in Bond and Twenty-third streets, are not to be paid for out of the earnings. Steps have been taken to capitalize these important expenditures by issuing $1,000,000 of first-mortgage bonds bearing 7 per cent. interest. The matter was considered at a meeting of the Executive Committee on the 2d, but Dr. Green subsequently stated that the details of the proposed bonding scheme had not yet been definitely arranged.

TELEPHONE.—American Bell, b 162, a 162.50; American Speaking, b 110, a 125; Currier Telephone Bell, b 3; Colombia and Panama, b 24.50, a 25; Continental, b 15; Dolbear, b 5, a 10; Erie, b 28, a 35; Globe, b 9, a 10.50; Hudson River, b 60, a 90; Inter-Continental, b. 95, a 1.25; Mexican, b 2.50, a 3.25; Mexican Central, a 3; Molecular, b 5, a 10; New York, a 85; New York and New Jersey, a 80; New York and Pennsylvania, b 50, a 78; Overland, b 8, a 17; People's, b 9.50, a 12; People's (N. E.), b 1.50; Shaw, b 10; Solenoid, a 125; Southern Bell, b 95, a 125; Southern New England, a 175; Tropical, a 200, b 250; West India Telegraph and Telephone, b 1 90, a 2.

The Boston *Advertiser*, of April 3, thus quotes the local telephone market: In telephone stocks, American Bell closed steady at 161; New England advanced ⅛ to 30½; Erie sold at 33, as before; Mexican sold at 2⅝, and Tropical at 2⅝.

The Boston *Herald*, of March 29, says:

New England telephone sold off to 27⅛ this morning on the passing of the current dividend. Later it reacted to 29.

Bell telephone was sympathetically weak, selling off to 165. There is some criticism of the Bell management for refusing to come to the financial relief of the New England Company, but the "longest heads" say the best course was that adopted.

The Boston *Herald* of the 30th has the following remarks on the Bell balance sheet: Bell telephone had a morning of weakness and afternoon strength, selling off to 161⅛ and rallying to 165. The appearance of the patent item of $6,591,324.30 among the liabilities in the company's statement of the 25th inst. continues to puzzle the curious. The explanation of its appearance is this. That amount is the balance of the account as it stood on the company's books, February 29, 1884. and being a credit balance it properly belonged among the liabilities as a profit. It is a liability to patents, and not for them. The company began long ago to credit its patent account with all receipts for rights granted under them, and the fact that such receipts have been in excess of the first cost of the patents has been the cause of the balance referred to. Had it been covered into profit and loss, instead of left as a patent item, nothing would probably have been thought of it. It is understood that it was put in as a separate item with the thought that shareholders would be interested to know the result of that business separate from the other branches.

ELECTRIC LIGHT.—American, b 2, a 4; Brush, b 50, a 80; Brush Illuminating, b 45, a 70; Daft, b 35, a 60; Edison, a 140; Edison Illuminating, b 55, a 75; Edison Isolated, b 55 a 90; Edison, European, b 3, a 15; Excelsior, b 20; Swan Incandescent, a 40; United States, b 90, a 96; United States Illuminating Company, a 95.

BUSINESS NOTICES.

D. VAN NOSTRAND, 23 Murray street, has issued a catalogue of electrical works, and a copy of it will be sent to any address upon application.

ELECTRICAL SUPPLIES AND APPARATUS.—The National Electric Co., 1,413 G street, Washington, D. C., Mr. George C. Maynard, General Manager, furnishes electrical supplies and apparatus of every description, prepares plans and estimates, fits up installations and maintains them, and undertakes expert work. Its business is large and growing.

THE NOVELTY ELECTRIC CO.—Mr. J. Chester Wilson, the electrician, now has an interest in the Novelty Electric Co., of Philadelphia, and has been appointed its general manager. The company succeeds to the business carried on hitherto by Mr. Wilson at 802 Chestnut street, that city. The business of the company includes the manufacturing of and dealing in all kinds of electrical instruments and supplies. Estimates and catalogues will be furnished on application.

GLASS FOR ELECTRICAL PURPOSES.—The name of the New England Glass Works, Boston, has long been honorably connected with the art of glass-making in this country, and in the hands of W. L. Libbey & Son it has increased in reputation. The works have a large and growing business in connection with electrical applications. A full line is carried of electric-light globes, bulbs, battery jars, etc., and articles of any special design or quality are made to order. All the productions are of perfect make, whether their chief purpose be that of utility or that of ornament. The manufactory is situated at East Cambridge, Mass. The salesrooms are at 155 Franklin street, Boston, and 38 Park place, New York.

OUR ILLUSTRATED RECORD OF ELECTRICAL PATENTS.

Edited by N. S. KEITH, Electrical Engineer and Expert, 237 Broadway, New York.

PATENTS DATED MARCH 18, 1884.

Artificial Pavement and Conduit for Electric Wires; Walter Berry and Peter Stewart, of Edinburgh, County of Midlothian, Scotland..... 295,334

Made up of blocks or slabs of granolithic paving composition described in U. S. patent No. 259,059, June 6, 1882.

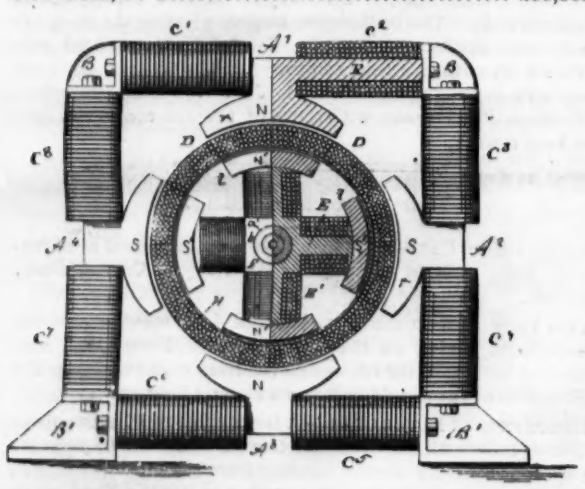
Automatic and Fac-Simile Telegraph; John Absterdam, New York..... 295,219

This transmitter consists essentially of a cylinder of conducting material upon the surface of which the characters, dots, dashes, etc., are placed in spiral lines of insulating material; and a conducting stylus which bears upon the cylinder and character in alternating succession when the drum is rotated.

Automatic Electric Switch; Thomas A. Connolly, of Washington, D. C..... 295,356

Consists in such construction and combination of parts as will give effect to an automatic switching system in which, first, the ordinary switch-board construction is employed; second, the mechanical operations are effected by any suitable motive power and controlled by electro-magnetic detents; third, the movement of parts is continuous when in action in contradistinction to intermittent or step by step.

Dynamo-Electric Machine; Thomas L. Dennis, of New York, N. Y..... 295,368



The pole pieces *N N*, *S S*, belong to a field-magnet system external to the armature-bobbins *D D*, and the pole-pieces *N' N'*, *S' S'*, belong to an internal system. The main feature consists in making the inner system of poles adjustable relatively to the external system by moving them backward or forward concentrically by rotation on the shaft *a'*.

Combined Fire and Police Alarm; John C. Henry, of Kansas City, Mo..... 295,249

The signal-box is provided with two doors, one for each alarm. Opening either door winds the actuating mechanism, weight or spring, and closing the door releases the clock-work so that it rotates to send the make-and-break signals.

Commutator for Electric Generators; Henry M. Stevens, of Boston, Mass., Assignor to Wm. Greene Howe, of same place, and Charles Storer.... 295,206

The thin strips of insulating material between the segments of the commutator are made automatically movable in and out, radially, so that their edges are beneath the surface when under the points of bearing of the brushes, but extend outside at other stages of the rotation; for the purpose of freeing the slits from accumulations of metallic or other conducting dust or dirt.

Electrical Conductor; Ross C. Stone, of New York, N. Y..... 295,207

A copper wire for conduction, is twisted with an iron wire for tensile strength, and the two are united by "galvanizing," as in zincking.

Elec ric Lamp; Thomas L. Dennis, of Jersey City, N. J..... 295,367

The tube constituting the upper-carbon carrier is slotted along its length to admit an axial arm of a lever. This arm carries within the tube a toggle-like clamp, which binds or releases, as desired, the tube by the oscillatory movement of the lever which is influenced by an electro-magnet and a spring working in opposition.

Electric Signaling Apparatus for Railroads; Frank L. Pope, of Elizabeth, N. J., assignor to the Union Switch and Signal Co., of Pittsburgh, Pa..... 295,427

Comprises mechanism and apparatus whereby the battery belonging to any signal station is prevented from actuating the signal of an adjacent section in either direction by reason of an accidental failure in the insulation which electrically separates one section from another.

Electrical Switch; Charles S. Shivler, of Brooklyn, N. Y..... 295,445

A permutation, or combination, switch, which enables a person knowing the predetermined combination, as in a lock, to open or close a window or door without sounding the alarm. Without moving the switch arm to the proper position the alarm is sure to be rung by the opening or closing operation.

Lightning Arrester for Electric Lines; Charles W. McDaniel, of Carthage, Mo..... 295,267

Especially intended for telephone lines.

Manufacture of Electric Conductors; Alfred A. Cowles, of New York, N. Y., assignor to the Ansonia Brass and Copper Co., of Ansonia, Conn..... 295,232

Consists in the method of preparing water-proof insulating tape, and in applying it in spiral winding, while hot, to the conductor.

Manufacture of Incandescing Electric Lamps; Wm. Holzer, Harrison, N. J., Assignor to the Edison Lamp Co., same place..... 295,398

Apparatus for and method of annealing incandescing electric lamps. The lamps are cooled by being passed over a series of burners of gradually-diminishing intensity of heat.

Secondary Battery Plate or Electrode; Eli T. Starr, of Philadelphia, Penn., Assignor of one half to Wm. J. Peyton, of Washington, D. C., and H. M. Lewis and James W. White, of Philadelphia, Pa.... 295,455

The plate is cast, or otherwise formed with interstices, or recesses, which are larger in sectional area internally than are their mouths. The object is to securely retain the porous absorb tive materials within the recesses.

Secondary Battery and Method of Constructing Electrodes Therefor; Eli T. Starr, of Philadelphia, Pa., Assignor of one-half to H. M. Lewis and James W. White, both of same place, and Wm. J. Peyton, of Washington, D. C..... 295,456

Consists in constructing and forming secondary-battery electrodes, by mixing mercury with another metal or metallic compound, capable of becoming active in a secondary battery to form a plastic mass, then shaping or molding the mass in a mold, and then subjecting the electrode thus formed to the action of an electric current while immersed in the electrolyte of a battery-cell.

Strike System for Secondary Electric Clocks; William H. Sawyer, of Providence, R. I..... 295,287

An extended and illustrated description of this invention will appear in another department in a subsequent issue of THE ELECTRICAL WORLD.

Switch-Board; Francis Blake, of Weston, Mass.....295,223

Consists in the combination with two series of conducting rods in a switch-board, one series crossing the other, of contact-pins sliding and tilting, one on each of the rods of one of the series. Also in hinging one series to the other.

Telephone Box; Augustus G. Davis, of Baltimore, Md. 295,365

Is a cupboard which contains the telephone transmitter, receiver, etc. When the door is opened it forms a shelf which may be used in writing. The opening of the door effects all the desired electric connections.

Tip for Electrical Conductors; George Doolittle, of Bridgeport, Conn., assignor of one half to Henry D. Stanley, of same place..... 295,371

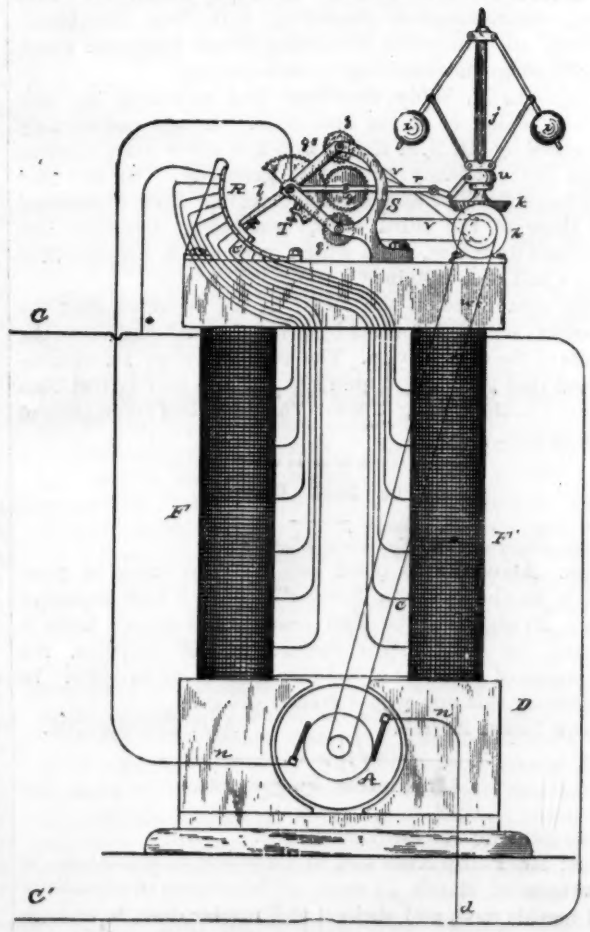
The wire of the tip is coiled at one end into a spiral which is passed over the flexible conductor as a sheath, and is tied thereat by the insulating cover.

Toy Electric Railway; Murray Bacon, of Philadelphia, Pa., Assignor to the Novelty Electric Co., of same place..... 295,473

A circular track, the rails connected with the battery-poles, and a locomotive which consists of a truck carrying an electro-motor, which receives its current from one of the rails and returns it to the other, and which gives motion to the wheels of the truck by direct mechanical connection.

Electro-Dynamic Motor; Frank J. Sprague, of North Adams, Mass..... 295,454

In the main consists of the combination of sections of field-coils, the armature in a shunt-circuit around a variable number of the sections and means for varying the relation between the number of sections around which the armature is shunted, and



the number with which the armature is in series. The figure shows one of the motors so constructed. *D* is the motor; *F F¹*, field-magnet coils wound in sections, the bights or loops being connected to the range of contact-pieces *R*, *i j i*, a centrifugal governor, with a movable collar *u*, the governor receiving motion from the armature *A* through belt *w* and bevel wheels *k k*. The belts *v v* communicate motion to two toothed-wheels *q q¹*, mounted in the frame *S*. This frame supports another wheel *q³* and an arm *r*, pivoted to the same axis, carrying another small wheel *q²*, which engages *q³*, and is connected by adjustable joint *r¹* to the collar *u*. According as *u* rises or falls, the arm *r* is carried up or down, and *q²* engaging *q* or *q¹*, communicates motion in one way or the other to *q³*, and thence to the adjustable arm *l*. This motion continues until the speed is restored to its normal, when *q*, is left free.